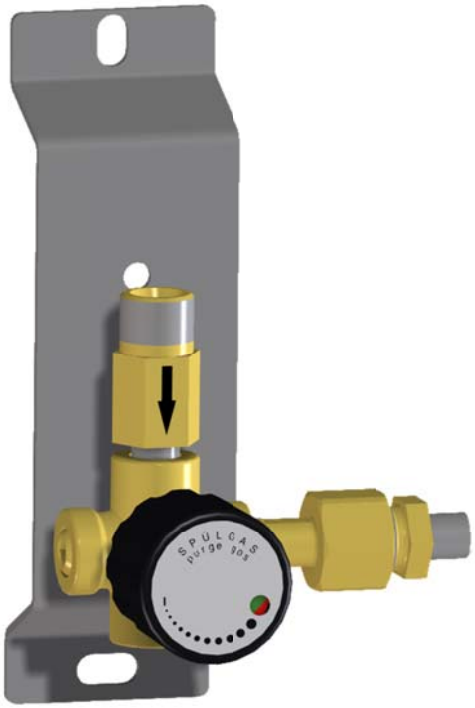
Operating Manual

for

Purge device

CRS2000-SP



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1. Introduction

1.1 General information

Validity

This Operating Manual applies to purge device of Series CRS2000-SP.

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Retention and completeness

- This Operating Manual is a component part of the purge device of Series CRS2000-SP and must be stored in a place where it is accessible to authorized persons at all times.
- Under no circumstances may chapters be removed from this Operating Manual. If the Operating Manual is lost or pages are missing – in particular the chapter "For your safety," – it/they must be replaced immediately.

Copyright

Updates

No update service is provided for this Operating Manual by Spectron Gas Control Systems GmbH. Changes to this Operating Manual may be made without further notification.

1.2 Description of the Series CRS2000-SP

Spectron pressure control panels of Series CRS can be used for toxic gases or gas mixtures.
Using such gases the following purge device CRS2000-SP is at least needed.
This device allows purging of the pressure control panel with an appropriate purge gas.
After shut-off of the gas source the remaining toxic process gas in the pressure control panel and the connecting lines will be mixed with the inert purge gas and purges via the waste gas valve and waste gas pipes to proper disposal.

1.3 Intended use

Bestimmungsgemäße Verwendung

The purge device CRS2000-SP is intended for use with corrosive gases up to quality 5.0.
The permissible gases and pressure ranges are specified on the type plate.
Purge devices are used for controlled inlet of purge gas into the gas supply components.
The inlet of the purge gas only happens through the non-return valve before the purge gas valve.
Pressure regulators without electrical components may be used in potentially explosive atmospheres, since they do not have a potential ignition source of their own (ignition hazard evaluated in accordance with DIN EN 13463-1).

Foreseeable misuse

The following operating conditions are deemed to constitute misuse:

- Operation with gases that are not specified on the type plate
- Use with gases in their liquid state
- Operation outside the permissible technical limit values
- Non-observance of the legal regulations and other provisions valid on-site
- Failure to comply with this Operating Manual
- Failure to carry out inspection and maintenance work
- Failure to heed the information on the type plate and in the product data sheet

1.4 Personnel requirements

Definition of "authorised person"

Authorised persons are persons with technical training, who have received technical instruction on the overall system and the associated hazards – gas cylinder – gas type – gas cylinder valve – pressure regulator – and who have successfully completed training courses on "The supply of pressurised gases."

Tasks of the operating personnel

Operating personnel must be able to recognise and – in as far as possible and permissible – remedy faults and irregularities.

Requirements for operating personnel

In order to perform their tasks, operating personnel must meet the following requirements:

- The operating personnel must have received instruction in the operation of the pressure regulator from an authorised person and must have read and understood this Operating Manual in its entirety.

2. For your safety

2.1 Symbols used

Danger!

This symbol warns that there is a **"risk of fatal injury"** or a health hazard for personnel.

2.2 Essential safety information

Note!

The following safety information is intended to supplement the applicable national accident prevention regulations and laws. The relevant accident prevention regulations and laws must always be complied with.

Various laws, regulations, rules and directives apply when handling pressurised gases and must be complied with, depending on the gas type.
The following list lays no claim to be exhaustive; it merely represents a selection of important documents:

- EU Directive 2009/104/EC (Work Equipment Directive)
- EU Directive 1999/92/EC (ATEX 137)
- EU Directive 98/24/EC (Dangerous Substances Directive)
- Industrial health and safety ordinance (implementation of Directives 2009/104/EC in German law)
- Ordinance on hazardous substances (implementation of Directive 98/24/EC and 1999/92/EC in German law)
- TRBS (technical regulations on industrial safety and health) publications
- TRGS (German technical rules for hazardous substances) publications
- TRAS (technical regulations on plant safety) publications
- BGV A1 German trade association basic accident prevention regulations
- BGR 104 German trade association rules on explosion protection
- BGR 132 German trade association rules for the avoidance of ignition hazards resulting from electrostatic charges
- BGR 500 2.26 German trade association rules on welding, cutting and related work procedures
- BGR 500 2.31 German trade association rules for working on gas lines
- BGR 500 2.32 German trade association rules for the operation of oxygen systems
- BGR 500 2.33 German trade association rules for the operation of systems that handle gas

2.3 Safety devices

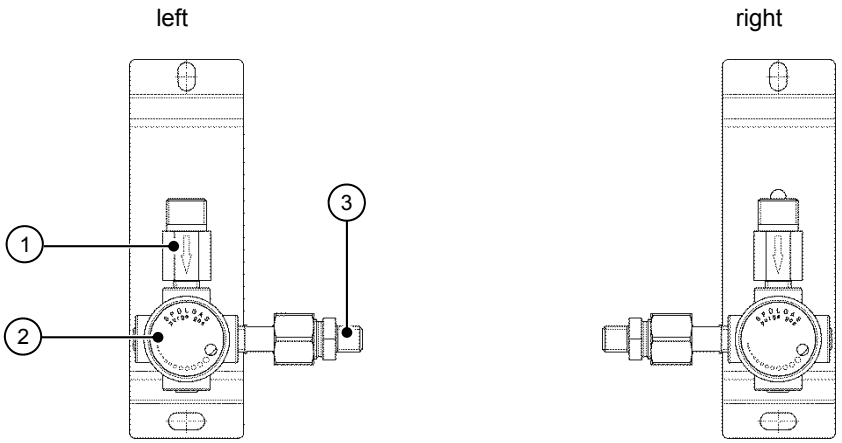
Danger!
With combustible, toxic, corrosive and other gases that are harmful to health or the environment, an exhaust pipe must be connected to the relief valve to discharge the gas safely.
The factory setting of the relief valve must not be changed!

Possible hazard	Measures for prevention
Risk of fatal injury! As cylinder pressure regulators with a purge device are predominantly used with toxic and/or corrosive gases, it must be ensured that the purged gases are safely discharged and disposed of correctly.	Connect a pipe routing the purged gases to a recycling facility to the waste gas valves of the cylinder pressure regulator.
Risk of fatal injury! If oxygen comes into contact with oil or grease, there is a risk of fire due to a chemical reaction.	Keep all components which come into contact with oxygen completely free of oil and grease.
Risk of fatal injury! Gas escaping into the ambient air can ignite; there is a risk of fire and explosion.	Smoking and naked flames are strictly prohibited in the vicinity of gas supply systems
Risk of fatal injury! The pressure regulator may be damaged by unauthorised changes or modifications and may no longer work as intended. There is a risk of the system malfunctioning, catching fire or being damaged.	No changes or modifications may be made without the written approval of the manufacturer's authorised technical experts.
Lebensgefahr! Werden Entspannungsstationen verwendet, die nicht für das entsprechende Gas und Druckbereich geeignet sind, besteht die Gefahr, dass durch eine chemische Reaktion ein Brand oder eine Explosion entsteht.	Die Entspannungsstation muss für das jeweilige Gas verträglich und für die vorliegenden Druckbereiche geeignet sein. Nur für Gase verwenden, für die eine Kennzeichnung vorhanden ist. Verfügt die Entspannungsstation über keine Gasartkennzeichnung, so muss die Verwendbarkeit für das jeweilige Gas beim Hersteller erfragt werden. Keinesfalls darf die Entspannungsstation ohne diese Information in Betrieb genommen werden.
Risk of fatal injury! If gases other than those specified on the type plate are used, there is a risk of the system malfunctioning, catching fire or being damaged.	Use only for the gases indicated on the device. If there are no gas types specified on the pressure regulator, the manufacturer must be consulted to establish which gases it can be used with. On no account may the pressure regulator be put into operation without this information.
Risk of fatal injury! Where the pressure regulator is operated with combustible, toxic or corrosive gases, the respective gas can escape into the environment if the relief valve is triggered.	The relief valves of pressure regulators for combustible, toxic or corrosive gases must be equipped with a pipeline routing the escaping gases to a safe and legally compliant recycling facility.

Risk of fatal injury! Gas escaping in an uncontrolled manner in closed rooms can reduce the oxygen content in the air to a potentially fatal level.	The blow-off pipe of systems operated in closed rooms must be routed into the open air. Toxic, corrosive or otherwise environmentally harmful gases must be disposed of in accordance with the applicable regulations.
Risk of fatal injury! If components which are not suitable for the pressure range of the cylinder pressure regulator are connected, they may rupture under the pressure load.	All accessories to be connected (screw fittings, pipes, fittings etc.) must be suitable for the pressure range specified on the type plate of the cylinder pressure regulator.
If the pressure regulator is used outside the specified ambient temperature range, there is a risk of the system malfunctioning, catching fire or being damaged.	Do not use in ambient temperatures below −30°C or over +60°C.
Dirt particles getting into the pressure regulator can damage it or cause it to malfunction.	It must be ensured that no dirt particles of any kind can get into the pressure regulator. For this reason, there is a filter incorporated into the process gas inlet of the pressure control panel.
Incorrect handling and improper use may result in danger to the user and other persons and damage to the equipment.	Use and handle the pressure regulator only as described in this Operating Manual.
If the connecting surfaces or gaskets of the fittings are damaged or missing, there is a danger of gas escaping in an uncontrolled manner.	Check the connecting surfaces for damage, and do not install if the connecting surfaces are damaged or gaskets are missing.

3. Description

3.1 Overview purge device



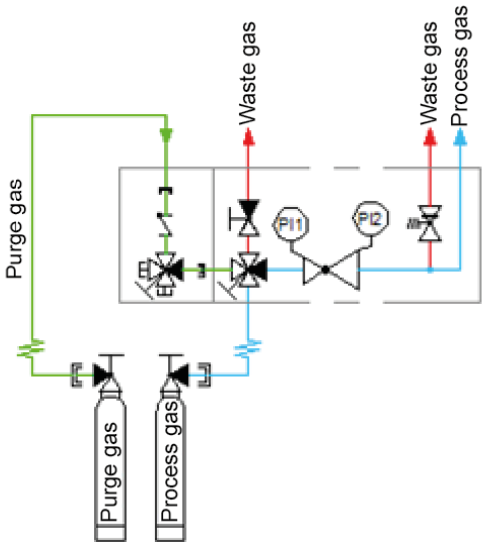
Parts of the purge device

Pos.	Designation	Description
1	Non-return valve	Allows the inlet of purge gas into the purge gas valve in flow direction and further into the pressure control panel. It prevents a back flow of process gas into the purge gas system at the same time.
2	Purge gas valve	Used to shut off the pressure control panel from the purge gas inlet.
3	Connection fitting	Used to connect the purge device to the process gas valve

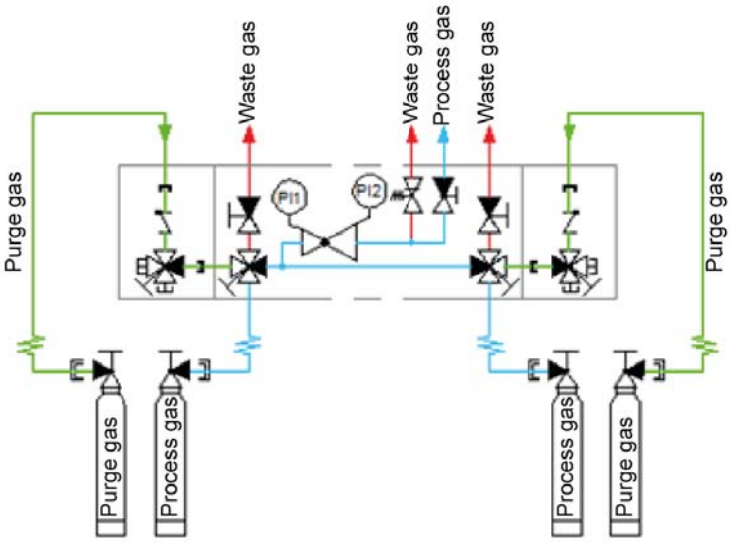
3. Description

Flow diagram for a single and double-sided pressure control panel with purge device

CRS2000-1 with purge device CRS2000-SP



CRS2000-2 with purge device CRS2000-SP



Key

- Process gas valve with inlet filter
- Waste gas valve
- Pressure regulator
- Inlet pressure gauge
- Outlet pressure gauge
- Relief valve
- Pigtail
- Gas cylinder connection
- Purge gas valve
- Check valve
- Valve port - closed

3. Description

3.2 Functional description

The purge device CRS2000-SP is used to inlet and shut off a special purge gas into connected pressure control panels CRS2000-1, CRS2000-2 or CRS2000-2L.

The pressure control panels type CRS2000 are also used for toxic gases. The purge process removes the process gas, which may be dangerous, from a high presure part of the pressure control panel. It is replaced by a neutral, inert gas for a short time (e.g. for exchanging the cylinders). This way you can open a cylinder connection without any health risk.

During a cylinder exchange ambient atmosphere including moisture will get into process gas wetted areas. To avoid chemical reactions between ambient atmosphere / moisture and process gas, you need to purge the same area, which was purged before the cylinder exchange.
Only when this is done properly the normal operation and supply of the following installation with process gas via the pressure control panel may be carried out.

3.3 Technical data

Note!

The technical data can be taken from the Spectron data sheet for the relevant product. If this is not available, you can view and download it at www.spectron.de.
The maximum inlet and outlet pressures and the gas type are indicated on the type plate.

3.4 Connection options

- Inlet pressure connection: G ½" male thread (EN 560)
- Outlet pressure connection: 1/4"-NPT male thread

4. Operation

4.1 Labelling

Labelling example

CO
CRS2000-SP
P1: 200 bar

Note!
The purge device must indicate the gas type which is to be used!

Warning!
The cylinder pressure regulator may only be labelled with the gas type for which it was ordered.

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4.2 Installing the purge device

Note!
Please see notes regarding mounting of the purge device in „3.2 mounting extension“ in the operation manual of the pressure control panel CRS2000.
The connection of the purge device to the pressure control panel is similar to the connection of the extension to the pressure control panel CRS2000.

The operation manual of the pressure control panels Series CRS can be viewed and downloaded at www.spectron.de.

4.3 Putting the purge device into operation

Note!
Commissioning is carried out together with the connected pressure control panel.
All valves have to be turned until to the limit stop when opening or closing!

Step	Activity
1	Make sure that • pressure control panel and purge device are labelled for the corresponding gas type, • all protection caps are removed, • the assembly was carried out correct, • all connections passed the leak test, • the cylinder valves of the process gas cylinders are closed, • the process gas valves of the pressure control valve are connected, • the waste gas valves are closed (red marking on the hand wheel visible), • the pressure regulator is released (turn hand wheel anti-clockwise) and • the low pressure area as well as the volume between the process gas valve and the pressure regulator is purged.

4. Operation

Step	Activity
2	Pressure purging with purge gas: • Slowly open gas cylinder valve of purge gas cylinder. • Open purge gas valve of purge device and let purge gas in. • Close purge gas valve • Open and close waste gas valve on the side to be purged to release the pressure. **Repeat at least 3x!**
3	The high pressure area is now purged and filled with purge gas.
4	Slowly open cylinder valve(s) of the process gas cylinders and start pressure purging with process gas. • Slowly open gas cylinder valve of process gas cylinder and close after gas inlet. • Open and close waste gas valve on the side to be purged to release the pressure. **Repeat at least 3x!** **This procedure must be repeated more often having low inlet pressure.**
6	Open gas cylinder valve of process gas cylinder.
7	Slowly open process gas valve. Using pneumatic process gas valves this step must be carried out before opening the cylinder valves! Using double sided pressure control panels, just open the process gas valve of the side, which has to go into service. The process gas valve of the reserve side remains closed.
8	Set the outlet pressure of the pressure regulator by slowly turning the hand wheel clockwise; make sure that there is no vibration during filling the following system. Otherwise that would harm the pressure regulator.
9	Leak test the complete pressure control panel and all detachable connections.
10	Gas withdrawl may start.

4.4 Cylinder change

Caution!

Each time you change the cylinder, check that the gasket is in perfect condition and replace it if necessary.

Note!

With every cylinder change ambient atmosphere will be let into the connections of the system. To avoid any contamination of the gases and the whole system, the connections must be purged before the next gas withdrawl.

Step	Activity
1	Close the process gas valve. In the case of two-sided pressure control panels, slowly open the gas cylinder valve and the process gas valve of the reserve side so that the reserve side can take over the supply function.
2	Close the gas cylinder valve and the process gas valve of the emptied gas cylinder.
3	To relieve the pressure completely, open the waste gas valve of the side on which the cylinder is to be changed and close it again once the pressure has been relieved.
4	Carry out pressure purging with purge gas in order to displace the remaining process gas from the area which will come into contact with the ambient atmosphere before changing the cylinder: · Open the purge gas valve of the purge device and allow the purge gas to flow in · Close the purge gas valve again · Open the waste gas valve on the side to be purged in order to relieve the pressure, and then close it again. Repeat at least three times!
5	Loosen the pigtail connection to the gas cylinder valve, replace the gas cylinder, and connect the pigtail to the new gas cylinder in accordance with the regulations.
6	Carry out pressure purging with purge gas again in order to displace the ambient air and humidity which has penetrated the high-pressure area: · Open the purge gas valve of the purge device and allow the purge gas to flow in · Close the purge gas valve again · Open the waste gas valve on the side to be purged in order to relieve the pressure, and then close it again. Repeat at least three times!
7	Using suitable means, check for leakage in the cylinder connection and all connections which were opened.

8	Carry out pressure purging with process gas: · Slowly open the gas cylinder valve. · Close the gas cylinder valve. · Open the waste gas valve of the side on which the cylinder has been changed – this relieves the pressure. · Close the waste gas valve again. **Repeat at least three times!** **If the inlet pressure is low, the process must be repeated more often.**
9	Slowly open the gas cylinder valve.
10	Slowly open the process gas valve. In the case of pneumatically operated process gas valves, this step must be carried out before opening the gas cylinder valves! In the case of two-sided pressure control panels, only open the process gas valve on the side that is to go into operation. The process gas valve on the reserve side remains closed.

4.5 Taking the equipment out of operation

The purge device is taken out of operation by closing the gas cylinder valve of the purge gas cylinder. To take the entire pressure control panel out of operation, follow the instructions in the corresponding section of the operating manual for the pressure control panel.

5. Faults

Faults/cause	Remedy
Purge gas does not flow into the areas to be purged when the purge gas valve is open	Check that the purge gas cylinder has sufficient pressure.
There is a leak. This indicates a defect in a component of the gas cylinder valve, the pressure control panel or the connection line.	Close all valves immediately. Have the pressure control panel inspected immediately by the manufacturer or an authorised specialist company.

6. Wartung, Maintenance, cleaning and repairs

6.1 Regular maintenance work and visual inspections

Regular maintenance work

To ensure that the equipment remains in perfect working order and that a constantly high level of operational safety and reliability is maintained, the pressure control panel should be checked once a year by a specialist.

Regular visual inspections

Visual inspection of all parts for	Interval
• Damage • Function • Leaks • Integrity/stability • Corrosion	Regular inspections at intervals of 12 months and each time the device is put into operation make an important contribution to the cost-effectiveness and preservation of the value of the fittings.

Note!

If you find defects during the visual inspection, do not put the purge device into operation! Have it checked immediately by the manufacturer or an authorised specialist company.

6.2 Regular cleaning

Warning!

Detergents or disinfectants can corrode and ruin gaskets inside the fittings. Do not use detergents or disinfectants for cleaning!
Severe contamination can lead to operational malfunctions. If it becomes necessary to clean the purge device, use only a damp, lint-free cloth..

6.3 Repair information

Caution!

Repairs may only be carried out by specialist personnel in authorised repair workshops. After repairs, the entire purge device must be checked in accordance with the original Spectron inspection instructions.
Safe and reliable operation can only be guaranteed if original spare parts are used.

Hinweis!

The manufacturer accepts no liability for damage resulting from unauthorised repairs or modifications carried out by the user or third parties without the express written approval of the manufacturer.

6.4 Returns

If the purge device is returned to the manufacturer for testing, maintenance or repair, and if it has been in contact with corrosive and toxic gases, it is imperative that it is adequately purged with inert gas.

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